$12.00 U.S.
WX-500
Stormscope®
Series II Weather Mapping Sensor
User's Guide
BFGoodrich
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BFGoodrich Avionics Systems, Inc.

Stormscope® System Advantages

Welcome

BFGoodrich Avionics Systems, the world's most experienced company in airborne thunderstorm avoidance instruments, is pleased to welcome you to the family of tens of thousands of pilots who are enjoying the benefits of safer flight with a *Stormscope*® weather mapping system.

The Original

Don't be fooled by *Stormscope* system look-alikes. There is only one *Stormscope* system, and only one company that makes the *Stormscope* line of weather mapping systems. The *Stormscope* system, the original, most accurate weather mapping system is manufactured by BFGoodrich Avionics Systems.

Fly with Greater Confidence

You now own the leading instrument in the world for airborne detection and mapping of thunderstorms. Unlike any other product, your new *Stormscope* sensor will enable you to make better informed thunderstorm avoidance decisions so you can fly more safely and with greater confidence than ever before.

Convenient Features

The advanced, patented technology in your new *Stormscope* was developed over many years and is so unique, so revolutionary, it surpasses all others. Here are some of its features:

- Precisely maps electrical discharges
- 200 nmi range
- 120° and 360° view of surrounding airspace
- Outputs both cell and strike data

$12.00 U.S.

WX-500
Stormscope®
Series II Weather Mapping Sensor
User's Guide

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BFGoodrich Aerospace

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Important Notice

All *Stormscope*® WX-500 functions are controlled through various Multi-Function Displays (MFDs). The many capabilities of the WX-500 allow MFD manufacturers to create screens compatible with the various functions of their display. The display screens illustrated in this guide are intended to be characteristic of a group of MFDs that are configured to work with the WX-500. The examples are intended to assist the pilot in interpreting lightning data output by the WX-500. Each MFD will show the information consistent with the capabilities of that particular display.

Safety Summary

These warnings and cautions appear later in this guide and are repeated here for emphasis:

(page 4-1)

Never use your *Stormscope* system to attempt to penetrate a thunderstorm. The FAA Advisory Circular, Subject: Thunderstorms, and the Airman's Information Manual (AIM) recommend that a pilot "avoid by at least 20 miles any thunderstorm identified as severe or giving an intense radar echo."

(page 4-1)

There are several atmospheric phenomena other than nearby thunderstorms which can cause isolated discharge points in the strike display mode. *Clusters* of two or more discharge points in the strike display mode however *do* indicate thunderstorm activity when they reappear after clearing the screen. Avoid the clusters and you'll avoid the thunderstorms. In the cell display mode, even a single discharge point may represent thunderstorm activity and should be avoided.

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Chapter 1
Description

GENERAL DESCRIPTION

The *Stormscope*® WX-500 Series II Weather Mapping Sensor detects electrical discharges associated with thunderstorms within a 200 nmi radius of the aircraft. This information is then sent to an external multifunction display (MFD) that plots the location of the associated thunderstorms.

The WX-500 is a passive sensor that listens for electromagnetic signals with a receiving antenna. There's no transmitter and no harmful transmissions. The WX-500 operates as well on the ground as in the air, thereby giving the pilot important planning information even before takeoff.

Figure 1-1 shows the two major components of the WX-500. Figure 1-2 shows how the components are connected to each other and to other aircraft systems.

Figure 1-1. Major Components

Processor

The processor houses the data acquisition circuitry plus circuitry to process heading and communicate with the external MFD. The processor is tray mounted.

Antenna

This combined crossed-loop and sense antenna is sealed in an aerodynamic flat-pack and mounted on the outside of the aircraft. *Stormscope* thunderstorm detection systems can

correlate the electric and magnetic signatures of lightning strikes better than other systems due to its patented sense channel technology. The antenna has been designed to help filter out pulsed noise from sources other than atmospheric electrical discharges.

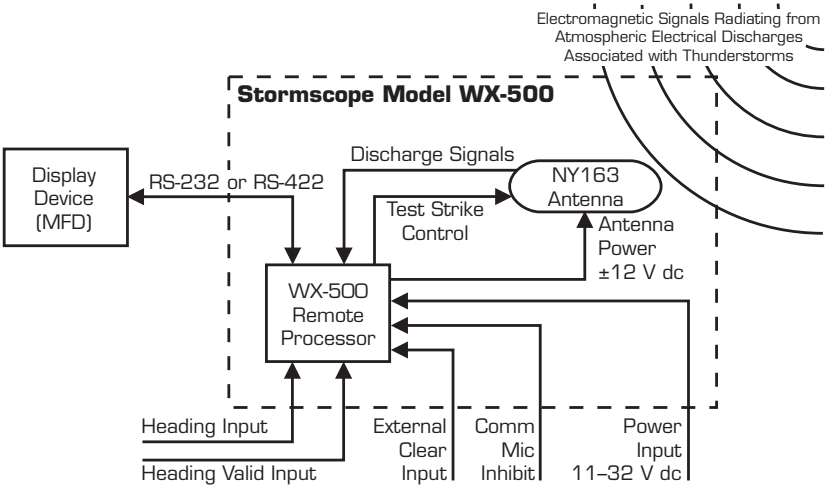

Figure 1-2. Functional Diagram

FUNCTIONAL DESCRIPTION

The antenna detects the electric and magnetic fields generated by intra-cloud, inter-cloud, or cloud-to-ground electrical discharges that occur within a 200 nmi radius of the aircraft and sends the resulting "discharge signals" to the processor. The processor digitizes, analyzes, and converts the discharge signals into range and bearing data then stores the data in memory. The processor then communicates this information to the external display as cells and strikes. The WX-500 updates the MFD every 2 seconds.

Cell Data

A clustering algorithm is used to identify the location of storm cells. Cell data is most useful during periods of heavy electrical discharge activity. Displaying cell data during these periods frees the pilot from sifting through a screen full of discharge points to better determine where the storm cells are located.

Strike Data

Strike data is most useful during periods of light electrical activity because it may plot the initial discharges associated with a building thunderstorm sooner than the cell display mode would. The WX-500 plots strike discharge points in relation to where the discharges are actually detected instead of plotting them close to an associated group of discharge points as is done in the cell display mode.

Strike Rate

The estimated strike rate may be used by pilots to determine if storm cells are building or decaying. The strike rate is calculated by the MFD for the current range and view. It represents the approximate strikes-per-minute.

FEATURES

- Detects and plots intra-cloud, inter-cloud and cloud-to-ground electrical discharges
- Completely passive system requiring no transmitter
- All control functions available through the MFD
- 200 nmi range
- Cell and strike data output to the MFD
- Heading stabilization – automatically repositions discharge points on the display relative to the latest aircraft heading when connected to a compatible heading system
- Three types of self test:
  - Power-up self test
  - Continuous self test
  - Operator initiated self test
- Remote clear—allows operator to clear discharge points from a remotely-mounted "clear screen" button (not supplied)
- Mic inhibit—inhibits thunderstorm processing when the communications transmitter is keyed to prevent the processing of corrupted data (some installations need to use this feature, others don't)

Chapter 2
Storm Mapping Principles

ANATOMY OF A THUNDERSTORM

The *Stormscope* model WX-500 is intended to help pilots avoid the dangers associated with thunderstorms (convective wind shear, lightning, icing, tornadoes, etc.). The WX-500 locates thunderstorms by detecting the electrical discharges that thunderstorms always generate. Figure 2-1 shows how thunderstorms create electrical discharges and radiate electromagnetic signals.

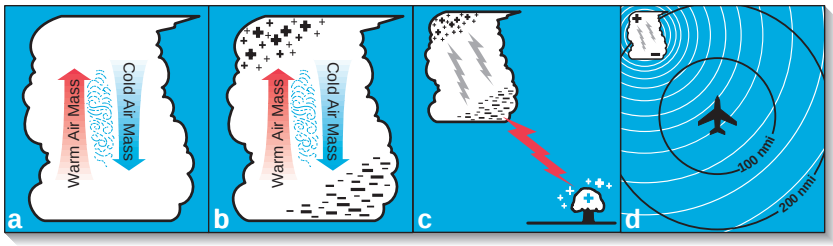

Figure 2-1. Electrical Discharges in Thunderstorms

a. The convective flow of air currents (warm air going up and cold air going down) leads to friction between the opposing air currents and wind shear in the space between the opposing air currents. The closer together the opposing air currents are, the greater the shearing force of the air currents.

b. The friction between the opposing air currents causes electrical charges in the area to separate. As positive (+) and negative (–) electrical charges are separated, they accumulate in masses of similar charges (positive charges near the top of the cloud and negative charges near the bottom).

c. Electrical discharges occur as the accumulated masses of separated positive and negative charges attempt to rejoin. These discharges continue to occur repetitively as long as the convective wind shear persists. A few of the discharges are visible as lightning, but most electrical discharges occur within a cloud or between clouds and are hidden by those clouds. Only a small percentage of discharges occurs between the clouds and the ground. Cloud to ground lightning occurs when the negatively charged lower part of a cloud induces a positive charge on an object on the ground. The immense charge separation finally breaks down the insulating air and a discharge occurs dumping negative charge from the cloud onto the object and the surrounding ground.

d. All electrical discharges radiate electromagnetic signals in all directions at the speed of light. The electromagnetic signals have unique characteristics and varying rates of recurrence and signal strength.

Figure 2-2 shows that the rate of electrical discharges detected in an area is directly related to the amount of convective wind shear turbulence present. In fact, as convective wind shear increases, the rate of electrical discharges increases at an increasing rate. This relationship means that if you find the electrical discharges, you've found the wind shear.

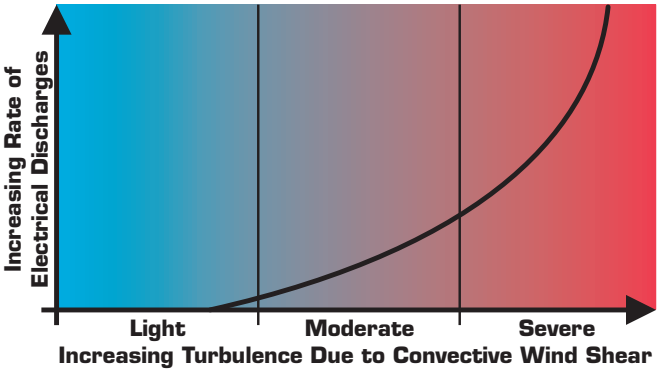

Figure 2-2. Discharge Rate a Function of Wind Shear

STAGES OF A THUNDERSTORM

All thunderstorms begin as cumulus clouds, build to an intense mature stage, and finally dissipate. Each of these stages in the life of a thunderstorm present a different set of dangers to aircraft. The WX-500 maps all stages in the life of a thunderstorm so that you may avoid a thunderstorm that can build, mature, and dissipate in as little as 20 minutes.

Cumulus Stage

The cumulus or beginning stage of a thunderstorm is usually precipitation free. In this stage, the risks to an aircraft and its occupants include strong vertical winds, severe turbulence, icing, and convective wind shear.

Mature Stage

In the mature and most intense stage of a thunderstorm, the water droplets within the cloud collide and combine to form rain and hail, and at cooler temperatures, sleet and snow. This stage poses many hazards to aircraft including heavy precipitation, high winds, convective wind shear, severe turbulence, downbursts, hail, icing, tornadoes, and lightning.

Dissipating Stage

In the dissipating stage, the updraft weakens and at the same time, the convective wind shear and other hazardous conditions begin to subside. There may be high rainfall rates in this stage, but the severe dangers are diminishing.

THE WX-500 AND WEATHER RADAR

The storm mapping technology used in the WX-500 is fundamentally different than the technology used in weather radar. Weather radar operates by transmitting UHF radio waves in the direction of interest and then receiving echoes from water droplets, whereas the WX-500 operates by receiving signals already present in the atmosphere due to electrical discharges. The WX-500 processor analyzes the unique characteristics of these signals, their signal strength, and their varying rates of recurrence to determine the location and intensity of the thunderstorms that generated the discharges. The WX-500 can receive radiated electromagnetic signals from electrical discharges up to 200 nmi away.

The cumulus stage of a thunderstorm (usually precipitation free) is unlikely to appear on weather radar; however, it generally does contain electrical discharges which *will* be detected by the WX-500 as a light but increasing cluster of discharge points.

The WX-500 is not subject to attenuation. Weather radar, however, is subject to attenuation and may not see the "storm behind the storm" or may understate its intensity. With the WX-500, electrical discharges are mapped throughout the storm area. The size of the cluster of discharge points detected by your WX-500 indicates the size of the storm area. The speed with which the discharge points appear indicates the intensity of the storm regardless of the size of the cluster. The more intense the storm, the faster the discharge points appear.

Chapter 3
Operation

INTRODUCTION

As mentioned earlier, WX-500 functions are controlled through the MFD. For detailed operating instructions refer to your aircraft Flight Manual Supplement and the documentation supplied with the MFD. The focus of this chapter is to provide supplemental information, which may be background information or a more detailed explanation of a particular operational feature. We assume the user is already familiar with their aircraft Flight Manual Supplement and the operation of the MFD. Chapters 2 and 4 discuss thunderstorms and weather display interpretation.

POWER-UP

At power-up, the WX-500 executes a power-up self test. The self test takes approximately 25 seconds to ensure that all major WX-500 functions are operating properly. Functions tested include antenna reception, memory, and microprocessor functions. An error message is displayed if a fault is detected. Refer to the section on error messages later in this chapter for more information.

CONTINUOUS AND OPERATOR-INITIATED SELF TEST

In addition to the power-up self test, the WX-500 performs a continuous self test. Items tested include antenna operation, microprocessor functions, memory, and heading inputs. This continuous self test is performed several times each minute. There are also provisions for an operator-initiated self test that can be executed through the MFD.

CLEAR ALL DISCHARGE POINTS

Clearing the discharge points periodically while you're monitoring thunderstorms is a good way to determine if the storm is building or dissipating. Discharge points in a building storm will reappear faster and in larger numbers. Discharge points in a dissipating storm will appear slower and in smaller numbers. There are provisions to clear discharge points through the MFD or an optional REMOTE CLEAR button.

If you have the standard heading stabilization feature connected and turned on, you do not have to clear discharge points after every heading change to ensure that the discharge points are positioned correctly with respect to the current heading.

HEADING STABILIZATION

The heading stabilization feature automatically adjusts the position of the discharge points on the display when your aircraft changes heading. Normally, if the WX-500 is installed to use the heading stabilization feature, you should never have to turn heading stabilization off; however, a situation may occur in which the heading input appears to be invalid but no heading flag is displayed. In this case, you should turn heading stabilization off until the heading input is corrected. If you are flying with heading stabilization turned off, or do not have a compatible heading system, you can clear all discharge points after each heading change to display new discharge points in the proper location relative to the nose of the aircraft.

ERROR MESSAGES

The WX-500 detects most common faults and sends error messages to the MFD indicating the nature of the faults and which functions may be inoperative. These error messages enable your authorized *Stormscope* dealer or BFG Avionics Systems factory service personnel to quickly diagnose and correct the fault. Table 3-1 lists all the possible error messages, the probable causes, and the recommended actions.

Table 3-1. Error Messages

Error	Fault Source	Type*	Recommended Action
Error 01 Processor Fault	Main processor	F	Turn off the unit and see your dealer for service.
Errors 05 thru 08 Processor Fault	Main processor memory	F	Turn off the unit and see your dealer for service.
Errors 09 thru 12 Processor Fault	DSP memory	F	Turn off the unit and see your dealer for service.
Errors 14 and 15 Processor Fault	DSP	F	Turn off the unit and see your dealer for service.
Error 16 Antenna Fault	Antenna is not able to receive or forward the necessary thunderstorm data or it could be a faulty connection	NF/R	Continue without weather mapping functions. See your dealer for service.
Error 17 Processor Fault	No test strikes**	NF/R	Continue without weather mapping functions. See your dealer for service if this error occurs frequently.
Error 18 Processor Fault	Invalid test strikes	NF/R	Continue without weather mapping functions. See your dealer for service if this error occurs frequently.
Error 19 Processor Fault	Main Processor data overload	NF/R	Continue without weather mapping functions. See your dealer for service if this error occurs frequently.
Error 20 Configuration Changed	Antenna jumper configuration changed since last time power	NF/R	Select antenna location via MFD. If selection matches processor configuration jumpers, normal operation

*F=Fatal, NF=Nonfatal, R=Recoverable, NR=Nonrecoverable (Description follows table.)

**Flying within 5 nmi of a certain Government antenna near Annapolis Maryland can also cause this error to appear. The recommended action in this case is to do nothing.

Table 3-1. Error Messages (Continued)

Error	Fault Source	Type*	Recommended Action
	was applied to the system		returns. If not correctable, continue without weather mapping functions and see your dealer for service.
Error 21 Processor Fault	Main processor	F	Turn off the unit and see your dealer for service.
Error 22 Invalid Synchro Signals	Invalid XYZ input (gyro may still be spinning up)	NF/R	Continue without heading stabilization. See your dealer for service.
Error 23 Invalid Synchro Ref	No 400 Hz reference	NF/R	Continue without heading stabilization. See your dealer for service.
Error 24 Mic Key Stuck	Mic key (inhibit line) stuck. The microphone key has been depressed for more than 1 minute	NF/R	Check your microphone key to correct the problem. If not correctable, continue without weather mapping functions and see your dealer for service.
Errors 25 thru 34 Software Error	Main processor	F	Turn off the unit and see your dealer for service.
Errors 35 and 36 Processor Fault	DSP or main processor	NF/R	Continue without weather mapping functions. See your dealer for service.
Error 40 Processor Fault	Main processor	NF/R	See your dealer for service if this error occurs frequently.
Error 41 Processor Fault	DSP or main processor	F	Turn off the unit and see your dealer for service.
Error 42 Processor Fault	Main processor	F	Turn off the unit and see your dealer for service.
Error 43 Invalid Request	MFD	NF/R	See your dealer for service if this error occurs frequently.
Error 44 thru 49 Serial Communications	MFD	NF/R	See your dealer for service if this error occurs frequently.
Error 50 Illegal Heading Value	MFD	NF/R	See your dealer for service if this error occurs frequently.
Error 51 Invalid Message	MFD	NF/R	See your dealer for service if this error occurs frequently.

*F=Fatal, NF=Nonfatal, R=Recoverable, NR=Nonrecoverable (Description follows table.)

Table 3-1. Error Messages (Continued)

Error	Fault Source	Type*	Recommended Action
Error 52 Invalid Antenna Change Request	MFD	NF/R	See your dealer for service if this error occurs frequently.
Error 53 thru 54 Communications Buffer Overload	MFD	NF/R	See your dealer for service if this error occurs frequently.

*F=Fatal, NF=Nonfatal, R=Recoverable, NR=Nonrecoverable (Description follows table.)

Nonfatal Faults

If a nonfatal fault occurs, all functions not directly affected by the fault will continue to operate. See your authorized *Stormscope* dealer as soon as possible to correct the fault.

Recoverable Faults

A recoverable fault is one that allows the affected functions to automatically resume proper operation after the fault goes away.

A messaging error (errors 43 through 51, 53 and 54) is an example of a recoverable fault. Messaging errors are likely caused either by excessive noise on the communication lines or an MFD communications problem. These messages automatically clear after the message is processed and therefore may appear only briefly on the MFD.

Nonrecoverable Faults

A nonrecoverable fault will allow you to continue operation, but without the function that is affected by the fault. The affected function will not resume proper operation until the system is turned off and repaired.

Fatal Faults

If a fatal fault occurs, all functions will cease to operate. In this case, turn off the WX-500 and see your authorized *Stormscope* dealer for service.

Chapter 4
Weather Display Interpretation

WARNING

Never use your *Stormscope* system to attempt to penetrate a thunderstorm. The FAA Advisory Circular, Subject: Thunderstorms, and the Airman's Information Manual (AIM) recommend that a pilot "avoid by at least 20 miles any thunderstorm identified as severe or giving an intense radar echo."

CAUTION

There are several atmospheric phenomena other than nearby thunderstorms which can cause isolated discharge points in the strike display mode. *Clusters* of two or more discharge points in the strike display mode however *do* indicate thunderstorm activity when they reappear after clearing the screen. Avoid the clusters and you'll avoid the thunderstorms. In the cell display mode, even a single discharge point may represent thunderstorm activity and should be avoided.

INTRODUCTION

The examples in this chapter are designed to help you relate the cell or strike patterns shown on your MFD to the size and location of thunderstorms that may be near your aircraft.

A blue and white grid in the examples represents the airspace around your aircraft. (See figure 4-1.) Each square in the grid represents a 100 by 100 nmi area. A circle represents the area being monitored by your WX-500. Areas of gray or black indicate thunderstorms. The darker the area, the greater the rate of electrical discharge activity.

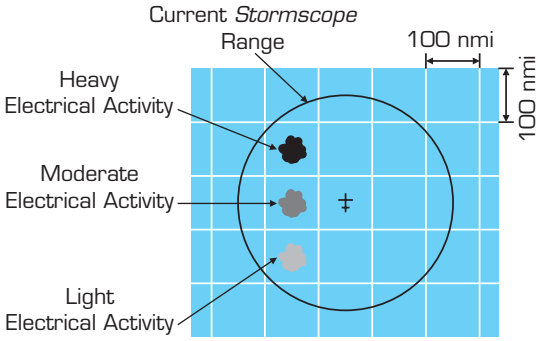

Figure 4-1. Airspace Diagram

The WX-500 detects electrical discharges and sends the processed information to the MFD which may display the discharges as cells or independent strikes. The examples in

this chapter include screen patterns to represent both cell and strike displays. These illustrations are intended to aid you in interpreting live storm data shown on the MFD.

Radial Spread

In the strike display mode, it is common for a triangular-shaped stream of discharge points to appear between the aircraft symbol and a cluster of discharge points within the range of the WX-500. A similar stream of discharge points may appear radiating away from the aircraft symbol in the direction of possible thunderstorm activity beyond the range of the WX-500. These phenomena are examples of radial spread. Discharge points in radial spread do not necessarily indicate the exact location of atmospheric electrical discharges. To counteract radial spread, BFGoodrich Avionics Systems applied its extensive research in lightning detection to develop enhanced lightning positioning algorithms. These algorithms (used only in the cell display mode) greatly reduce radial spread and improve the depiction of thunderstorms on the display.

TYPICAL PATTERNS

Three Clusters within the 200 nmi Range

Figure 4-2 illustrates the 360° weather view at the 200 nmi range. Using this knowledge, the three clusters of discharge points on the left-hand screen (cell display mode) can be interpreted as representing three thunderstorm cells at the following azimuth and range:

Cluster	Azimuth (clock position)	Range
1	11 o'clock	180 nmi
2	4 o'clock	75 nmi
3	4 o'clock	180 nmi

Analysis of the right-hand screen (strike display mode) yields a similar, but less certain interpretation due to radial spread.

The screen can also tell us about the relative amount of electrical discharge activity in thunderstorm cells. Clusters 2 and 3 have more discharge points than cluster 1 indicating greater electrical discharge activity. All three clusters however must be avoided because you can't necessarily determine the severity of thunderstorms based strictly on the number of discharge points. For example, in the western United States, a severe thunderstorm may only have a few electrical discharges.

When the range is changed to 100 nmi (figure 4-3), only cluster 2 remains visible. Clusters 1 and 3 are beyond the 100 nmi range and therefore no longer appear on the screen. (Clusters 1 and 3 would again be visible if the range were returned to 200 nmi.) Cluster 2 is now more defined and the discharge points are larger. The interpretation of cluster 2 remains the same: a moderately active thunderstorm at azimuth 4 o'clock, range 75 nmi. Notice on the right-hand screen (strike display mode) that there is less radial spread than on the 200 nmi range. In general, radial spread is reduced on the shorter ranges.

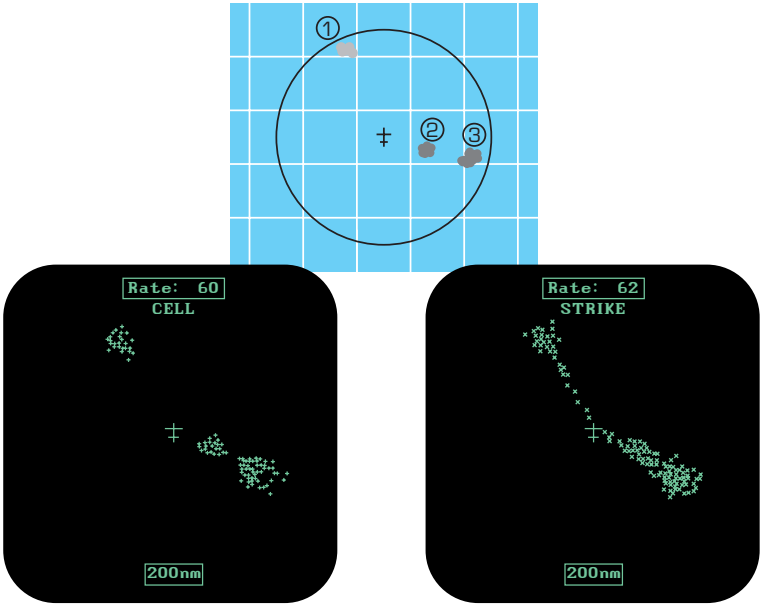

Figure 4-2. Three Clusters Within 200 nmi

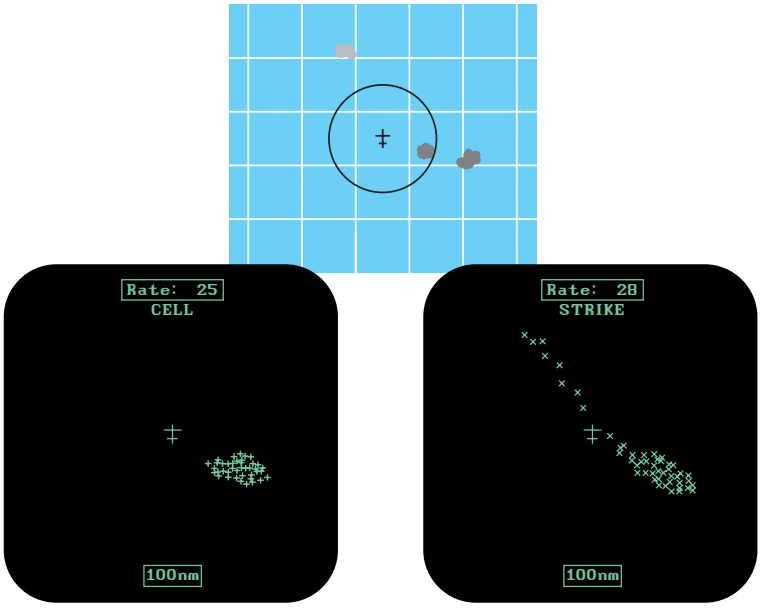

Figure 4-3. Range Changed to 100 nmi

Two Clusters within the 200 nmi Range

Figure 4-4 illustrates the 360° weather view at the 200 nmi range. Using this knowledge, the two clusters of discharge points on the screen can be interpreted as representing one thunderstorm cell at 5:30, about 150 nmi from the aircraft, and another thunderstorm cell at 1 o'clock, about 100 nmi from the aircraft. The cluster at 1 o'clock has less radial spread (in the strike display mode) and fewer discharge points than the cluster at 5:30 indicating a lower rate of electrical activity. Both clusters must be avoided.

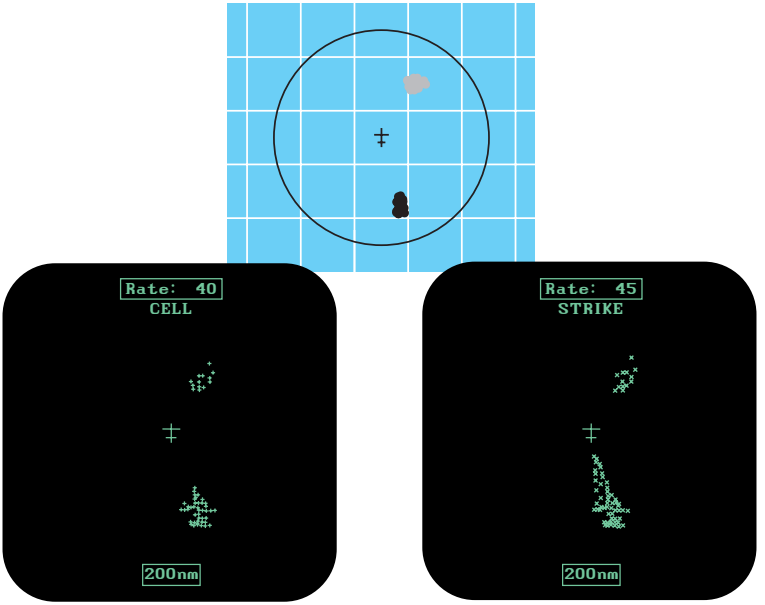

Figure 4-4. Two Clusters Within 200 nmi

MAPPING HEADINGS PAST THUNDERSTORMS

Figures 4-5 through 4-8 and the following paragraphs depict the progression of an aircraft past several thunderstorms.

Range Set at 200 nmi

Figure 4-5 shows the 360° weather view at the 200 nmi range. Two thunderstorms appear almost as one cluster of discharge points off the nose of the aircraft, centered 180 nmi away. A second cluster at 9:30 indicates a storm system which contains three thunderstorms.

Aircraft Progresses 100 nmi

Figure 4-6 shows that the aircraft has maintained its heading and progressed 100 nmi. The two thunderstorms off the nose of the aircraft appear to have expanded horizontally on the screen. This effect is normal anytime you get close to a storm. The line of thunderstorms previously at 9:30 now appears at 8:30.

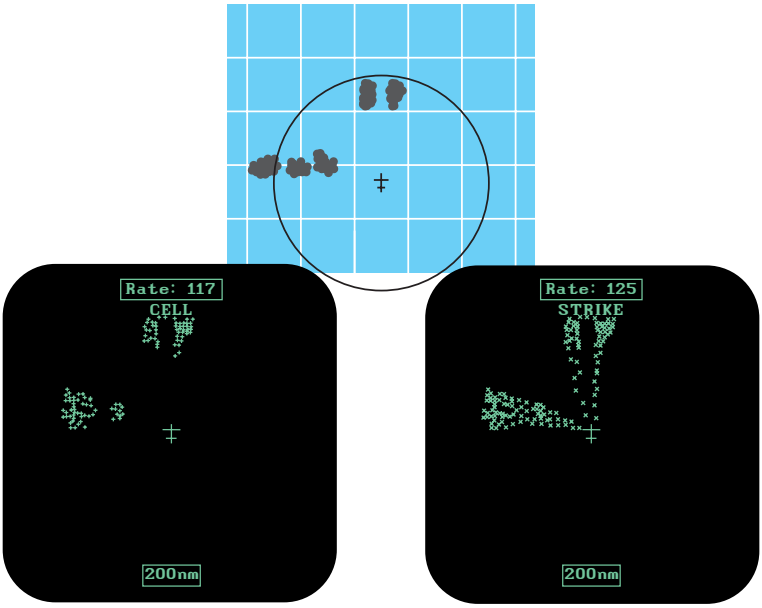

Figure 4-5. Range Set at 200 nmi

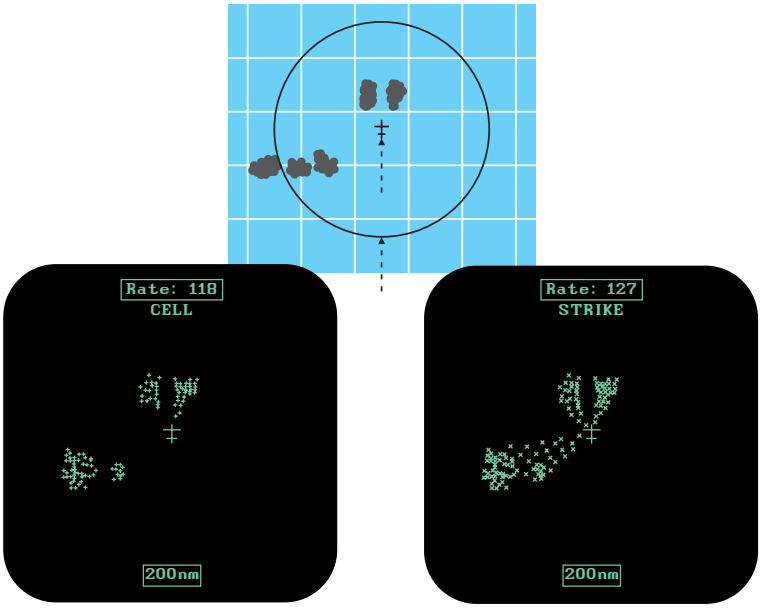

Figure 4-6. Aircraft Progresses 100 nmi

Range Changes to 100 nmi

Figure 4-7 shows the screen a short time later in the 120° weather view at the 100 nmi range. The thunderstorms at 8:30 are not visible in this view but the thunderstorms off the nose of the aircraft appear in greater detail as two separate thunderstorms. The thunderstorms at 11:30 and 12:15 are centered 90 nmi from the aircraft. Information is now sufficient to map a route around the thunderstorms.

Aircraft Turns to Avoid Thunderstorms

Figure 4-8 shows the screen a short time later after the aircraft has turned to the right to avoid the thunderstorms. When connected to a compatible heading system, the WX-500 automatically rotates new discharge points to their correct position relative to the new heading.

SPECIAL PATTERNS

Randomly Scattered Discharge Points

Atmospheric instability associated with cumulus clouds, or developing or dissipating thunderstorms could cause randomly scattered discharge points as shown in figure 4-9. Random discharge points are more likely to appear in the strike display mode than in the cell display mode due to the cell display mode's clustering algorithm. If you observe random discharge points, continue to monitor the screen for developing clusters which indicate thunderstorm activity.

Cluster and Splattering Within 25 nmi

Figure 4-10 illustrates the 360° weather view at the 25 nmi range. One moderately active thunderstorm appears as a cluster of discharge points at 8:30 centered 14 nmi away with a splattering of discharge points throughout the 25 nmi range. Such splattering is due to electrical discharges within 3 to 5 nmi of the aircraft and indicates that the aircraft is too close to the thunderstorm.

Continue to head away from the main cluster. While the main cluster should be your primary concern, you should also avoid any grouping of discharge points within the 25 nmi range. Switch to the other range settings to ensure that there is no thunderstorm activity indicated along your intended path.

You'll notice in figure 4-10 that the location of random, individual discharge points is about the same on both the cell and storm display modes. This is true because in the cell display mode, the WX-500 plots every electrical discharge detected within the 25 nmi range at the exact location detected unless the discharge is associated with a cluster of discharges, in which case the discharge point is clustered with the associated discharge points. You'll also notice that there are more points in the cluster of points at 8:30 in the cell display mode than there are in the strike display mode. This is due to the cell display mode's clustering algorithm "pulling in" individual discharge points associated with the cluster.

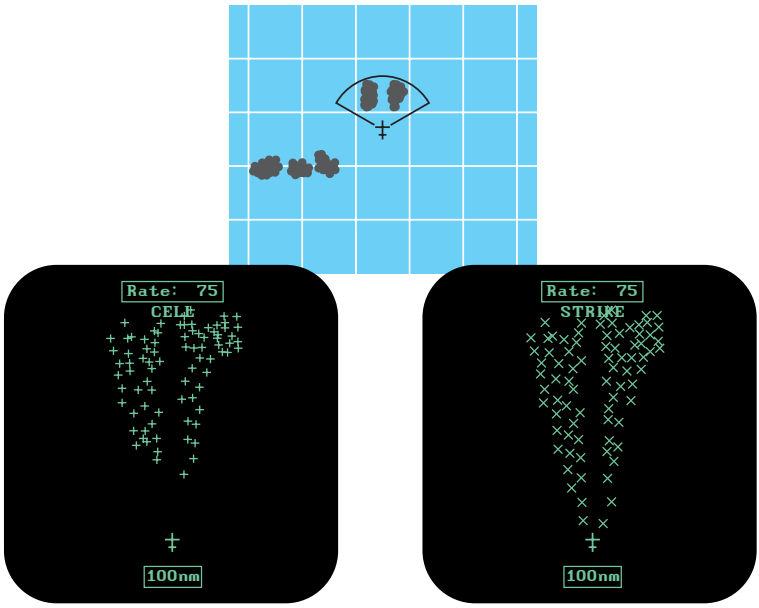

Figure 4-7. Range Changes to 100 nmi

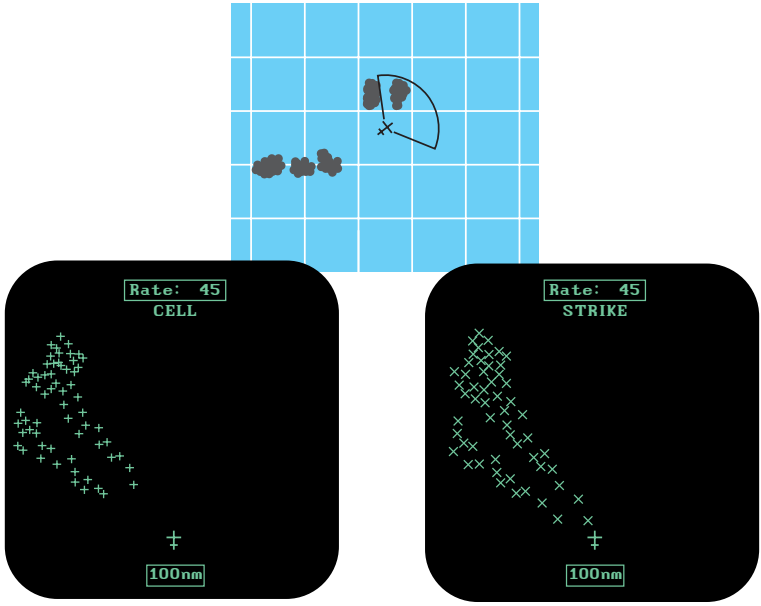

Figure 4-8. Aircraft Turns To Avoid Thunderstorms

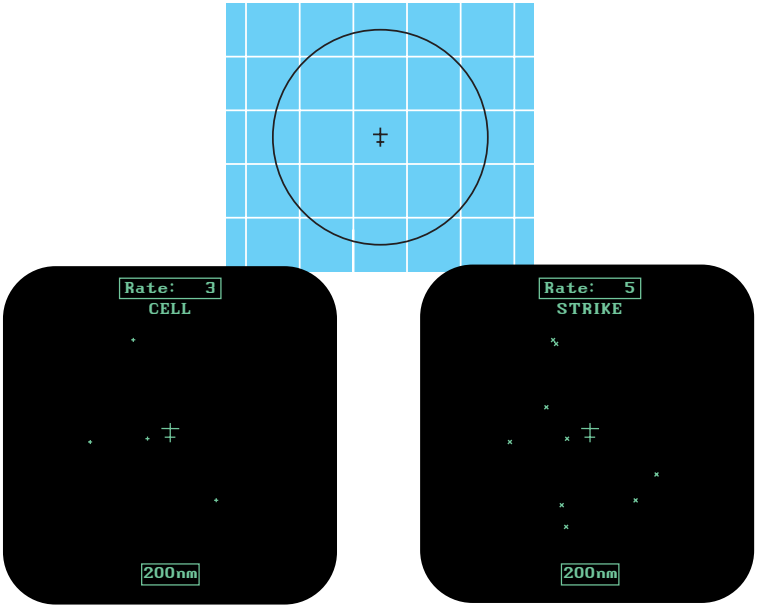

Figure 4-9. Randomly Scattered Discharge Points

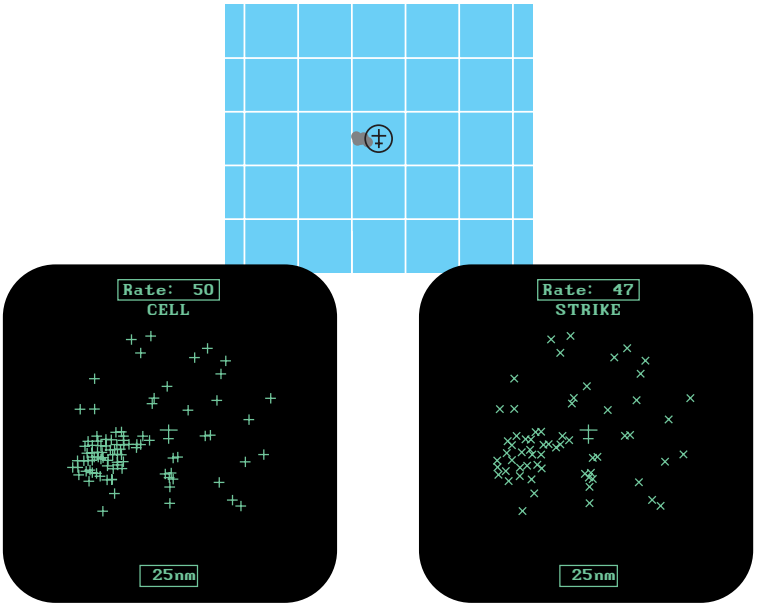

Figure 4-10. Cluster and Splattering Within 25 nmi

Discharge Points Off Aircraft's Nose

Figure 4-11 illustrates the 360° weather view at the 200 nmi range. The discharge points ahead of the aircraft could be caused by a strong thunderstorm just beyond the 200 nmi range. Another scenario might be that electrical discharge signals are arriving via atmospheric skip from a distant thunderstorm well beyond the WX-500 range. In either case, no immediate action is required.

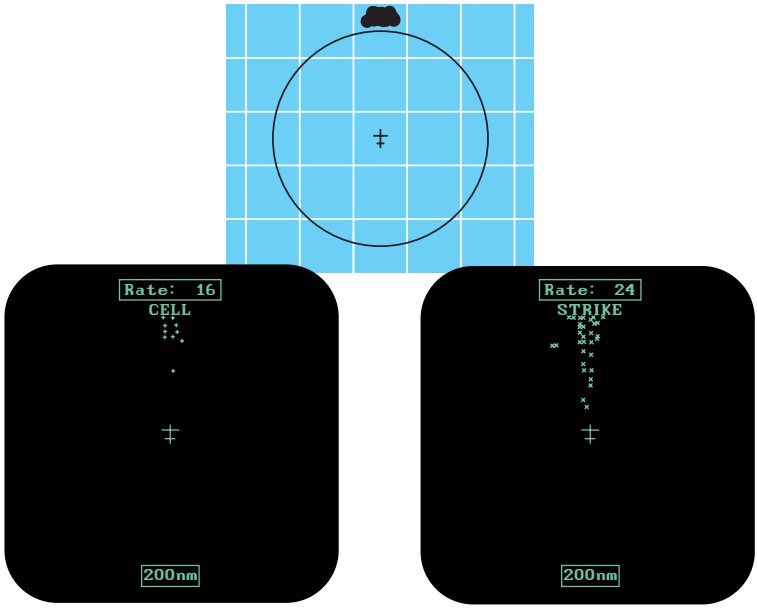

Figure 4-11. Discharge Points Off Aircraft's Nose

Line of Discharge Points While Taxiing

Passing over a cable beneath the taxiway can cause a line of discharge points across the screen as shown in figure 4-12. Similar concentrations of discharge points across the screen may appear while taxiing due to electrical signals from nearby equipment such as arc welders or subway rails. After passing the source of the interference, clear the screen.

Developing Cluster Within the 25 nmi Range

Figure 4-13 shows a developing thunderstorm 12 nmi from the aircraft. If you see a screen such as this with a developing cluster within 25 nmi, you should change course to avoid the storm and continue to monitor the *Stormscope* sensor information displayed on the MFD.

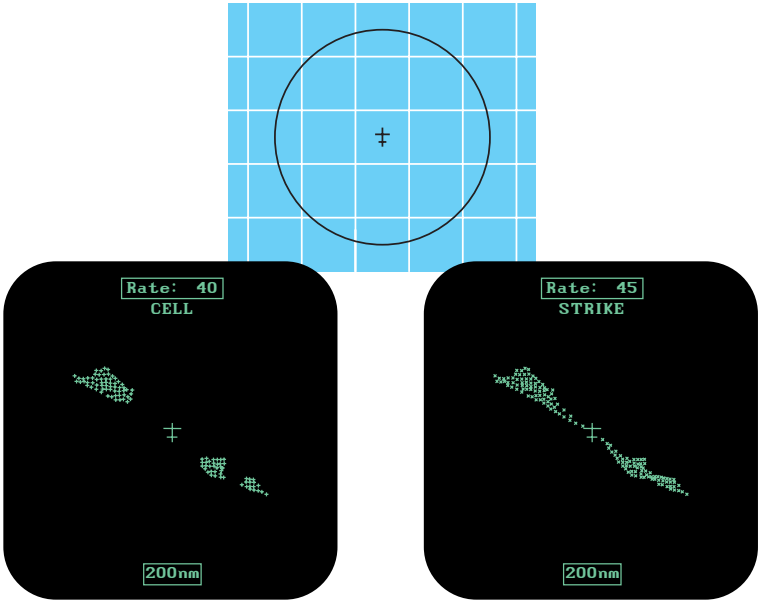

Figure 4-12. Line of Discharge Points While Taxiing

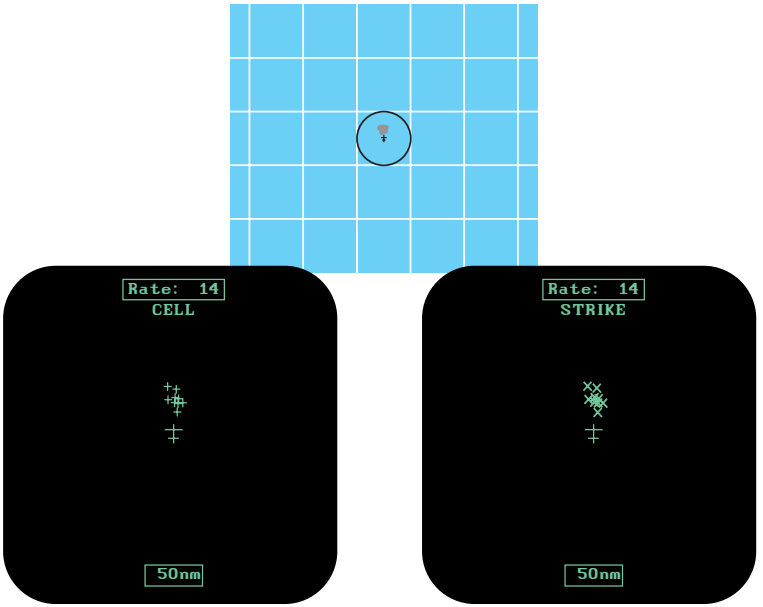

Figure 4-13. Developing Cluster Within 25 nmi Range

Chapter 5
Specifications

Table 5-1. Stormscope WX-500 Specifications

Part Number:
805-11500-001

Features:
Cell or Strike mode
200 nmi range
Built-in self tests
Automatic heading stabilization
Microphone inhibit line
Integrity indicator

Dimensions:
Processor (includes mounting tray and pull handle):
5.6 inches (14.22 centimeters) high
2.2 inches (5.59 centimeters) wide
12.0 inches (20.48 centimeters) deep
Antenna:
1.00 inch (2.54 centimeters) high
3.45 inches (8.76 centimeters) wide
6.85 inches (17.40 centimeters) long

Weight:
Processor:
2.5 pounds (1.13 kilograms)
Antenna:
0.84 pound (0.38 kilogram) without doubler plate

Electrical Characteristics:
Input voltage:
11 to 32 volts dc
Current:
0.82 A (maximum) @ 12 volts dc
0.38 A (maximum) @ 28 volts dc

Operating Altitude:
Processor:
55,000 feet (maximum)
Antenna:
55,000 feet (maximum)

RTCA Compliance:
Processor Environmental:
DO-160C Category F2-BA(NBM)XXXXXXZ(AB)ABZTZAZEZXX
Processor Software:
DO-178B Level D
Antenna:
DO-160C Category F2-AC(YCLM)XSFXXXXXXXZXZXXE3XX

TSO Compliance:
TSO C110a

Chapter 6
Warranty Information

INTRODUCTION

The *Stormscope* WX-500 sensor is warranted for 2 years from the date of installation (not to exceed 30 months from the date of shipment from BFGoodrich Avionics Systems) subject to the following limitations.

WARRANTY STATEMENT

BFGoodrich Avionics Systems, (hereinafter called BFGAS), warrants each item of new equipment manufactured or sold by BFGAS to be free from defects in material and workmanship, under normal use as intended, for a period of 30 months from date of shipment by BFGAS to an authorized facility, or 24 months from date of installation by an authorized facility, whichever occurs first. No claim for breach of warranties will be allowed unless BFGAS is notified thereof, in writing, within thirty (30) days after the material or workmanship defect is found.

The obligation of BFGAS shall be limited to replacing or repairing at its factory the equipment found defective under terms of this warranty certificate; providing that such equipment is returned in an approved shipping container, transportation charges prepaid, to BFGAS, Grand Rapids, Michigan, or such other location as BFGAS may authorize. BFGAS reserves the right to have necessary repairs performed by an authorized agency.

This warranty shall not apply to any unit or part thereof which has not been installed or maintained in accordance with BFGAS instructions, or has been repaired or altered in any way so as to adversely affect its performance or reliability, or which has been subjected to misuse, negligence or accident.

This warranty is exclusive and is accepted by buyer in lieu of all other guaranties or warranties express or implied, including without limitation the implied warranties of merchantability and fitness for a particular purpose. Buyer agrees that in no event will BFGAS liability for all losses from any cause, whether based in contract, negligence, strict liability, other tort or otherwise, exceed buyer's net purchase price, nor will BFGAS be liable for any special, incidental, consequential, or exemplary damages.

BFGAS reserves the right to make changes in design or additions to or improvements in its equipment without the obligation to install such additions or improvement in equipment theretofore manufactured.

A Subsidiary of The BFGoodrich Company

RELATED POLICIES AND PROCEDURES

a. If the original registered owner of a *Stormscope* WX-500 sells the aircraft in which the WX-500 is installed during the warranty period, the remaining warranty may be transferred. Written notification of the transaction must be submitted by the initial recipient of the warranty to:

ATTENTION: WARRANTY ADMINISTRATOR
BFGoodrich Avionics Systems
5353 52nd Street, S.E.
Grand Rapids, MI 49588-0873
U.S.A.

b. Equipment must be installed by a BFG Avionics Systems authorized dealer or installer. Installation of equipment by facilities not specifically authorized will void the equipment warranty.

c. Notice of a claimed product defect must be given to BFG Avionics Systems or a designated BFG Avionics Systems service agency within the specified warranty period.

d. A product which is defective in workmanship and/or material shall be returned to BFG Avionics Systems via any authorized dealer with transportation charges prepaid. After correction of such defects, the equipment will be returned to the dealer, transportation prepaid by BFG Avionics Systems via surface transportation. Any other means of transportation must be paid by the customer.

   The risk of loss or damage to all products in transit shall be assumed by the party initiating the transportation of such products. All items repaired or replaced hereunder shall be warranted for the unexpired portion of the original warranty.

e. BFG Avionics Systems is in no way obligated or responsible for supporting or participating in the costs of the installation warranty. The entire responsibility lies with the BFG Avionics Systems authorized dealer making the installation. BFG Avionics Systems is only responsible for the product warranties outlined in the warranty statement.

f. BFG Avionics Systems cannot authorize warranty credit for troubleshooting of other systems in the aircraft in order to reduce noise interference with the *Stormscope* WX-500 sensor.

Record of Important Information

Dealer Information

Name _____

Address _____

City, State, Zip _____

Telephone _____

Equipment Information

Date of Purchase _____

Installation Date from FAA Form 337 _____

Processor

Model Number _____

Part Number _____

Serial Number _____

Firmware Version _____

Antenna

Model Number _____

Part Number _____

Serial Number _____

Note

To ensure that a repaired *Stormscope* meets the FAA TSO, gets foreign government approval, and meets BFGoodrich Avionics Systems, Inc. performance standards, your WX-500 must be reinstalled and tested by a BFG-authorized *Stormscope* dealer.

BFGoodrich
Aerospace

009-11501-001 (Rev. A, 9/10/97)

BFGoodrich Avionics Systems, Inc.
5353 52nd Street, S.E.
P.O. Box 873
Grand Rapids, MI 49588-0873 USA

Stormscope®
Series II *Weather Mapping Systems*